

ASIAN LONGHORNED BEETLE



BACKGROUND

Asian Longhorned Beetle (ALB) is an exotic pest native to China. The larva of this beetle kills trees by tunneling through the tree, which girdles stems and branches.

ALB most likely traveled to the United States inside wood packaging materials from China, and has been intercepted at various ports of entry and warehouses throughout the country. In the United States the beetle prefers to attack maple species (*Acer* spp.), such as: Boxelder, Sugar, Norway, Silver and Red maple. In high concentrations or if there are not enough maples present they will also attack Birch, Elm, Horsechestnut, and Ohio Buckeye. It has also occasionally attacks: Ash, London Planetree, Mimosa, Poplar, and European Mountain Ash.

Though ALB has not been found in Iowa, there are current ALB infestations in New York, New Jersey, Ohio, and Massachusetts. In addition ALB infestations have been discovered and subsequently eradicated in Chicago, Illinois; Hudson County, New Jersey; and Islip, New York.

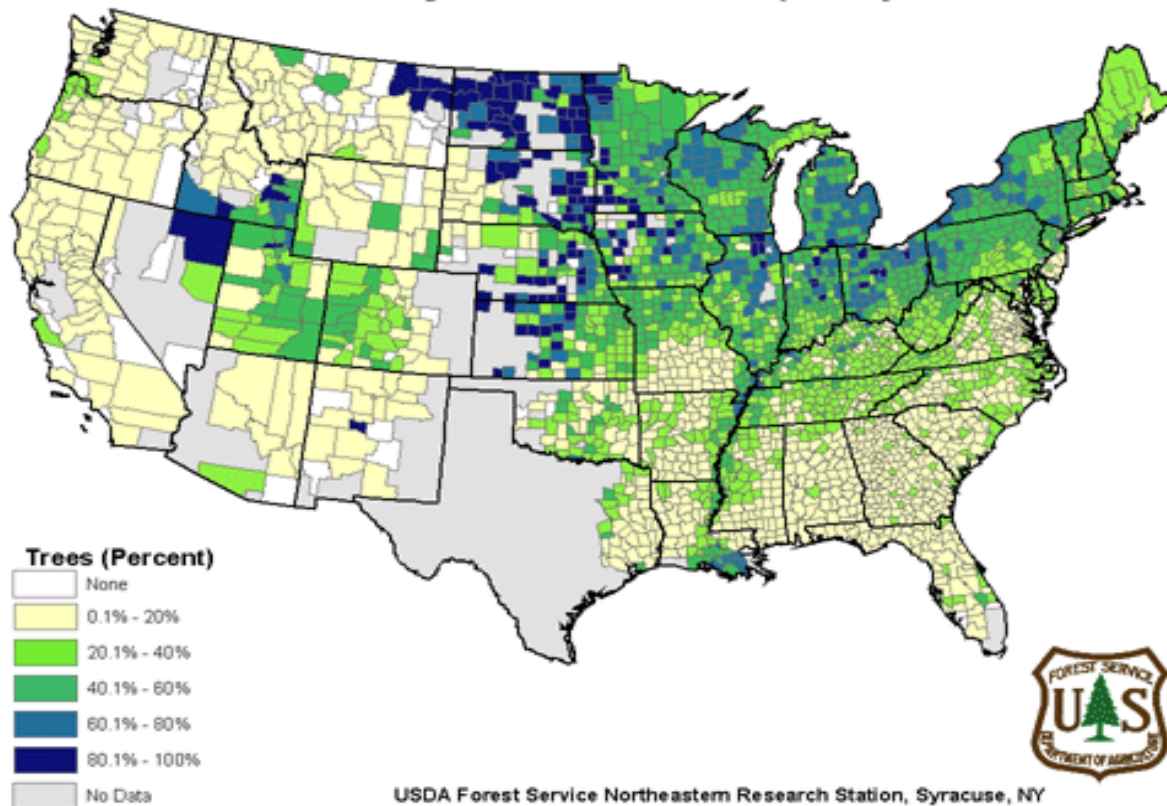
ALB can easily be transported by the movement of infested logs, firewood, pallets, shipping crates, and other solid wood products.

CONTROL

Though potentially devastating, through severe measures, ALB outbreaks have been controlled and eradicated in several areas of the country. When ALB has been confirmed in an area a survey team is dispatched to determine the full extent of the infestation. Surveys are conducted by people visually inspecting trees for signs of ALB, once the area of the infestation is established another half a mile is added to the radius to create the treatment zone. Following that all host trees within the treatment zone are either removed or chemically treated. Trees that are removed are chipped down to at least 1 inch on two sides, at this size the wood is no longer subject to federal or state regulations and may be disposed of freely. For chemical treatments Imidacloprid has been found effective in controlling ALB and is used on a tree-by-tree basis. When implementing chemical treatments either soil or trunk (mauguet or pressurized) injections, or bark sprays are used. The bark sprays are mainly used as a method to control the adult beetles or the egg masses.



Asian Longhorned Beetle Susceptibility - Known Host

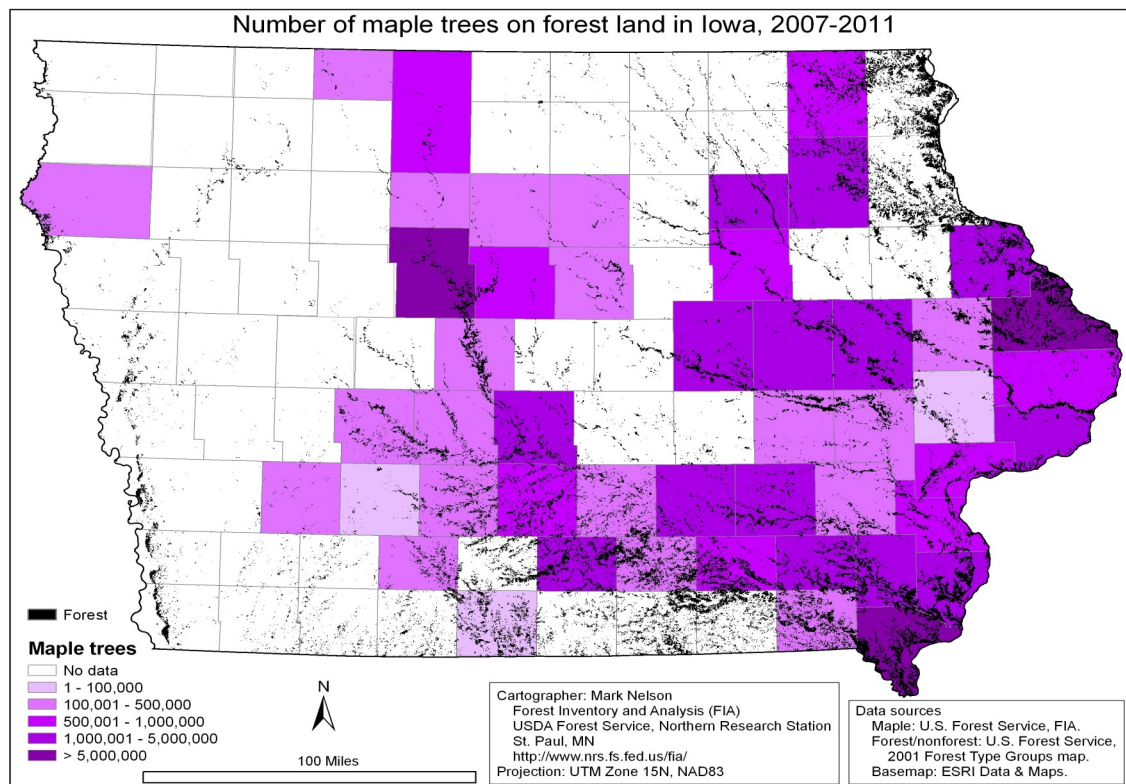
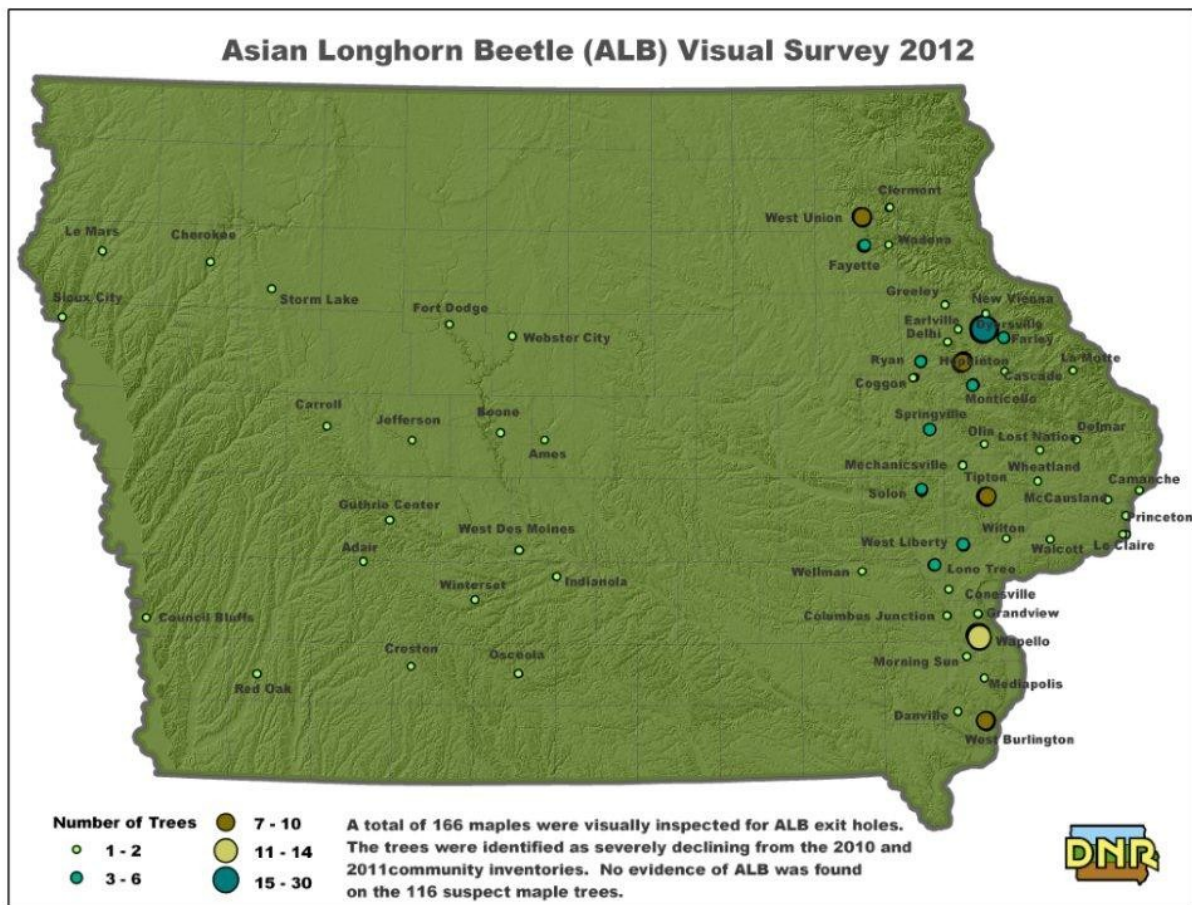


USDA Forest Service Northeastern Research Station, Syracuse, NY

Maps: top to bottom

ALB infestation map [map]. "United States Department of Agriculture Animal and Plant Health Inspection Service". <<http://beetlebusters.info/>> (Accessed September 05, 2012).

Urban Forests, Human Health, and Environmental Quality. Asian Longhorned Beetle Susceptibility—Known Host [map]. "USDA Forest Service Northeastern Research Station". <http://www.nrs.fs.fed.us/disturbance/invasive_species/alb/local-resources/docs/ALB_potential.pdf> (Accessed September 05, 2012).



Map:
Iowa Department of Natural Resources, Forestry Bureau. Asian Longhorned Beetle (ALB) Visual Survey 2012 [map]. Iowa Department of Natural Resources. 2012.
Nelson, Mark. Number of Maple Trees on Forest Land in Iowa, 2007-2011 [map]. USDA Forest Service, Northern Research Station. 2012.

WILDLIFE

Maple trees have moderate importance to wildlife as cover and food. Seeds are eaten by birds and small mammals and the buds are eaten by birds, squirrels and deer. The trees are used for nesting sites by many birds.

MANAGEMENT

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance a landowner can have when managing their woodlands is to maintain a diversity of tree species; while ensuring an appropriate number of trees are growing on each acre. The best management plan for communities is to create diversity by not having more than 10% of any one species represented. These simple management plans provide the best defense against emerging forest health threats.

ECONOMIC IMPACTS

Using existing data from Forest Inventory and Analysis plots, Timber Product Output surveys, and the most recent street tree inventories, we can estimate the potential economic impact of ALB in Iowa. The economic impacts of ALB would occur in four areas, 1) loss to the wood products industry as trees die, 2) loss to forest landowners with maple trees on their property, 3) negative impacts on Iowa wildlife, and 4) the loss to communities as street trees die.

The annual impact to the wood products industry includes foregone payments to landowners and loggers, and the lost value added at sawmills. In addition, these losses will lead to further effects throughout the economy, as landowners, loggers and mill operators have that much less economic stimulus not only in the direct community but eventually worldwide. (This “indirect” effect was calculated using IMPLAN software, data and models.) These are annual losses that the Iowa economy would forgo in the future based on the amount of maple that is being harvested annually in Iowa.



ALB Larva



ALB Exit Hole



ALB Damage

Images top to bottom:

Steven Katovich, USDA Forest Service, Bugwood.org

USDA APHIS PPQ Archive, USDA APHIS PPQ, Bugwood.org

E. Richard Hoebeke, Cornell University, Bugwood.org

ANNUAL STATEWIDE WOOD PRODUCTS LOSS

Annual Volume Harvested (bdft)	23,155,030	Sawlogs ¹
Estimated Economic Value to Landowners	\$5,788,757.50	Assuming \$.25/bdft revenue ²
Estimated Economic Value to Sawmills	\$5,788,757.50	Assuming \$.25/bdft revenue
Estimated Economic Value to Manufacturers	\$5,788,757.50	Assuming \$.25/bdft revenue
Indirect Economic Impact	\$5,730,870	
Total Economic Impact	\$23,097,142.50	

Based on 2011 estimates, Iowa has over 1.76 billion board feet of merchantable size maple growing in Iowa's 3.1 million acres of forest. The potential loss of income of this readily available material to Iowa forest landowners is summarized below. This is the estimated value of the maple resource that exists in Iowa today.

STATEWIDE LANDOWNER VALUE

Total Merchantable Value (bdft)	1,760,027,426	sawlogs ³
Estimated Economic Value to Landowners	\$440,006,856.50	Assuming \$.25/bdft revenue

Tree canopy for Iowa communities averages 12%. Losses from affected urban trees include the cost of removing the tree, its "landscape value" and the cost of replacing it. Landscape value is a catch-all term that includes everything from a tree's aesthetic value to its impact on property values, pollution removed from the environment and utility costs. Losses from affected urban trees are not annual, but rather a one-time phenomena, although spread out over many years. These numbers assume residential trees on private property represent the same percentages for maple as is being documented during street tree inventories. Community street tree inventories do not take into account maple occurring in city parks and other urban areas or private residential areas. Communities and homeowners will bear the cost burden of removing dead trees caused by ALB.

STATEWIDE URBAN TREE AND STREET TREE LOSS

Number of Maple Trees ⁴	9,521,127	
Removal Costs ⁵	\$4,760,563,500	\$500/ tree
Replacement Costs	\$1,428,169,050	\$150/ tree
Landscape Value ⁶	\$1,761,408,495	\$185/ tree annually
Total Economic Impact	\$7,956,141,045	

¹ Miles, P.D. Tue Sep 04 11:17:29 CDT 2012. Forest Inventory EVALIDator web-application version 1.5.1.2. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: <http://apps.fs.fed.us/Evalidator/tmattribute.jsp>]

² Price/bdft determined using Timber Prices published by the Illinois Department of Natural Resources, June 2012.

³ Miles, P.D. Tue Sep 04 10:56:51 CDT 2012. Forest Inventory EVALIDator web-application version 1.5.1.2. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: <http://apps.fs.fed.us/Evalidator/tmattribute.jsp>]

⁴ Iowa Community Forestry Tree Inventories, 23 communities, average number of street and park trees.

⁵ Average removal and stump grinding costs, communication with Iowa arboriculture industry.

⁶ Estimated using i-Tree STRATUM Analysis

To determine the total economic impact to the wood products industry, annual industry losses are calculated in the table below using existing harvesting rates. Assuming that ALB arrives next year and that the losses are spread out over 20 years, we can estimate losses by determining the net present value (NPV) of each year's impact. NPV translates future dollars into today's dollars, using a discount rate. One way of thinking about NPV is to imagine paying for future losses by putting some money in the bank today. For example, putting \$100 in the bank today at a 5% interest rate could pay for a \$105 in damages next year.

Net Present Value Calculation of Loss of Maples over the next 20 years in Woodlands; assuming 5% discount rate and indirect impact rate of 22%.

Year	Wood Products Industry (Future Dollars)	Present Value (2012) dollars
2012	\$859,630	\$2,578,891
2013	\$1,146,174	\$3,438,522
2014	\$1,432,717	\$4,298,152
.....
2028	\$5,444,326	\$16,332,979
2029	\$5,730,870	\$17,192,610
Total (during spread)		\$41,203,817
Years 2030 on (total)	\$5,730,870	\$180,522,403
Total Present Value of the Loss		\$222,000,000
Discount Rate		5%
Total Annualized Value of the Loss		\$18,000,000

CONCLUSION

Under these assumptions, the total impact of ALB to Iowa's wood products businesses is over **\$222 million** or an annualized loss of over **\$17 million** in 2012 dollars for now into perpetuity for the Iowa's economy. The result changes with the discount rate (for example, the total present value of losses go up if the discount rate goes down to the current Federal Funds rate target of 0.25%). Additionally, indirect economic losses would be over **\$5 million** for non-timber products and over **\$8 billion** for community trees. If Iowa can prevent the introduction of ALB – losses farther in the future are worth less today. If you are experiencing declining maple trees on your property, contact your local district forester to assess the health of those trees.



Before, During, and After the clean-up of an ALB infestation in Chicago, IL

For additional about ALB:

http://www.nrs.fs.fed.us/disturbance/invasive_species/alb/local-resources/docs/ALB_potential.pdf

<http://beetlebusters.info/>

<http://www.na.fs.fed.us/fhp/alb/>

http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml

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REFERENCES

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- Invasive Species and Pest Management. 2008. New Pest Response Guidelines Asian Longhorned Beetle. USDA APHIS PPQ. <http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/downloads/alb_response_guidelines.pdf> (Accessed September 05, 2012).
- USDA APHIS PPQ New Pest Advisory Group (NPAG) Report 1996.
- USDA Forest Service. 2008. Pest Alert Asian Longhorned Beetle (*Anoplophora glabripennis*). USDA Forest Service Northeast Area State and Private Forestry. Newtown Square.
- Peng, J. and Liu Y. 1992. Iconography of Forest Insects In Hunan China. Hunan Forestry Department/Institute of Zoology, Academia Sinica.

All Images:

Michael T. Smith, Bugwood.org



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